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297.4 ± 1.0 . The value of this quantity derived in 1910 from observed deflections of the vertical in the United States was 297.0 ± 0.5 .⁴ The very close agreement between these two independent values, an agreement which is well within the probable error of either one, is strong evidence both of a very high degree of accuracy of each and of very successful elimination of systematic errors.

Helmert's value of 1915 is 296.7 ± 0.4 . It is based upon 410 gravity stations in various parts of the world. These stations were selected carefully with reference to their relation to topography, a precaution which is necessary with Helmert's method of computation, though not with Mr. Bowie's method. Helmert's method of computation differs radically from that used by Mr. Bowie, yet the two end results are in close agreement.

It is the writer's opinion that Mr. Bowie's monograph on the topic "Investigations of Gravity and Isostasy," is a notable contribution to geodesy. It furnishes a new and broader basis for further studies by geologists and students of geophysics. It furnishes new evidence of the steadily increasing skill and energy with which the Coast and Geodetic Survey is attacking the scientific problems which come within its scope. It is hoped that this article touching upon a few of the main points in the monograph will help arouse such interest as will lead to study of the monograph itself.

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THE NATIONAL ACADEMY OF SCIENCES

THE following abstracts have been received of the papers to be presented at the stated meeting of the National Academy of Sciences to be held in Washington on April 16, 17 and 18.

Sex-Determination and Sex-Differentiation in Mammals: FRANK R. LILLIE, The University of Chicago.

⁴ "Supplementary Investigation in 1909 of the Figure of the Earth and Isostasy," p. 77.

Sex-determination in mammals is zygotic, but it does not imply an irreversible tendency to the indicated *sex-differentiation*. Intensification of the male factors of the female zygote from the time of onset of sexual differentiation by action of male sex hormones may bring about very extensive reversal of the indicated sex-differentiation. This result is attained by a study of the twins of cattle. The way is open for an experimental examination of the limits of such reversal, and for an examination of the possibilities in the case of the male zygote.

Sporogony of Malaria Parasites: Photomicrographs of Infected Anopheles: W. V. KING, Ph.D., Bureau of Entomology. (Introduced by L. O. Howard.)

The cycle of development through which malaria parasites pass in the body of anopheline mosquitoes has been described in more or less detail by several authors. The illustrations of the developmental phases are, however, mostly taken from drawings which are often schematic and in some cases misleading. The opportunity is therefore taken for presenting the accompanying series of photomicrographs representative of the various stages in the complete sporogonic cycle, and a brief explanatory description of the development as observed in fresh preparations of infected mosquitoes. A few differences from the description as given in some of the texts have been observed and these are substantiated by the illustrations. The work was done in the laboratory of Dr. C. C. Bass, Tulane University, New Orleans.

The Great Barrier Reef of Queensland, Australia: W. M. DAVIS.

In recent years a number of students of coral reefs have concluded that the Great Barrier Reef of Queensland has been built up on a slightly submerged platform, of origin independent of coral growth and presumably similar to that of the continental shelf which borders the eastern coast of Australia, south of the limits of coral reefs.

There is, however, good reason to think that the present immature reef is an upgrowth from a submerged mature reef plain of an earlier time, if the changes of level that have taken place in the highlands inland from the coast are considered. Following the studies of E. C. Andrews, of Sydney, the highlands of eastern Australia in the region near the boundary between New South Wales and Queensland show the work of several cycles of erosion, each separated by an uplift of several hundred or a thousand feet. When these uplifts took place, the off-shore belt must have been de-

pressed and the line of no change must have migrated westward toward the land, because in spite of the repeated uplifts, there are no belts of marine deposits along the shore line. The last of these changes is comparatively recent. It was preceded by a long period of still-stand, during which the border of the mainland was worn down to low relief, even though it consisted of rather resistant rocks. Preceding that still-stand period, a tilting similar to the one that has recently taken place raised the land area and depressed the marine area. Inasmuch as the recent tilting introduced reef growth, there is every reason to think that the earlier tilting also introduced reef growth; but while the reef of recent introduction is still immature, because of its youth, the reef of the earlier cycle must have reached advanced maturity in the long still-stand that followed its beginning, and thus its original lagoon area must have been converted into a reef plain, overlapped by deltas built out from the initial shore lines of that time. It is on the outer part of this reef plain, now submerged, that the present reef appears to have grown up. The fact that, contemporary with both cycles of reef formations off the Queensland coast, a continental shelf was in process of formation by unimpeded marine action off the coast of New South Wales, in no wise invalidates the above conclusions: the two processes are going on at the same time on adjoining coasts now; they may have been similarly synchronous and neighborly at earlier times also.

Searching for a Doubtful Geological Zone in the Canadian Rockies: CHARLES D. WALCOTT.

The stratigraphic position of the Mount Whyte formation of the Cambrian system in the Canadian Rockies having been questioned, I searched for evidence of its place during the field season of 1916 and found that it forms the upper member of the Lower Cambrian terrane both from the evidence of its contained fauna and its stratigraphic position. This conclusion is supported by the sections of the Cambrian formations in the Lake Champlain and the Lower St. Lawrence valleys.

The Influence of Diet upon the Heat Production During Mechanical Work in the Dog: R. J. ANDERSON AND GRAHAM LUSK.

The energy production in a dog moving at the rate of about three miles per hour is the same whether he be given no food or 70 grams of glucose. However, when the dog is given meat the increase in energy production during exercise is equal to the sum of the increases which the two influences of exercise and chemical stimulation

through the metabolism of amino-acids would individually have induced.

What Determines the Natural Duration of Life?

JACQUES LOEB AND J. H. NORTHRUP.

Each species seems to have a characteristic average duration of life. In order to find out the nature of the variables responsible for this duration, experiments were made on the temperature coefficient for the duration of life of an insect (*Drosophila*). The experiments were carried out on breeds free from all microorganisms to avoid the objection that bacterial poisons formed in the intestine influenced the result. It was found that the temperature coefficient was of the order of that of a chemical reaction as we had found previously in non-sterile cultures. This result means that the duration of life is due either to the cumulative formation of harmful substances in the normal metabolism of the body leading to the phenomenon of old age and death; or that it is due to the gradual elimination or destruction of substances without which life becomes impossible.

The Difference in the Action of Antipyretics according to Species of Animals Subjected to this Action, the State of Health of the Animals, the Height of their Normal Temperature and the Substance Employed: T. S. GITHENS (by invitation) AND S. J. MELTZER. From the Department of Physiology and Pharmacology of the Rockefeller Institute.

The principal point of this communication, arrived at by experimental observations, consists in the fact that subcutaneous injections of antipyretics administered to healthy hens, roosters and pigeons, whose normal temperature is regularly higher than that of normal mammals, reduces the temperature by several degrees centigrade, while injections of corresponding doses of the drug into healthy mammals have only either a slight effect or none at all. On the other hand, pyramidon reduces perceptibly the normal temperature in both classes of animals. In human beings all antipyretics reduce febrile temperatures more or less strongly, while the normal temperature is affected by them only slightly.

SCIENTIFIC EVENTS

NITROGENOUS COMPOUNDS IN GERMANY

ACCORDING to an article in the *Revue générale des Sciences* by Professor Camille Matignon abstracted in *Nature*, before the war Germany was the greatest consumer of combined nitrogen. In 1913 the consumption